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Astilean

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(54) **LEG-POWERED TREADMILL**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 146 days.

(21) Appl. No.: **12/925,770**

(22) Filed: **Oct. 29, 2010**

Related U.S. Application Data

(60) Provisional application No. 61/280,265, filed on Nov. 2, 2009.

(51) **Int. Cl.**
A63B 22/02 (2006.01)

(52) **U.S. Cl.** **482/54**

(58) **Field of Classification Search** 482/23, 482/37, 51, 54, 69–71, 79; 119/700; 434/247, 434/255; D21/662, 668–669; *A63B 22/02*
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,211,765	A *	1/1917	Schmidt	482/54
3,489,408	A *	1/1970	Goodrich	472/89
3,637,206	A *	1/1972	Chickering, III	482/54
3,642,279	A	2/1972	Cutter	
3,669,238	A *	6/1972	Folkes et al.	198/805
4,614,337	A	9/1986	Schonenberger	
5,470,293	A	11/1995	Schonenberger	
5,577,598	A	11/1996	Schoenenberger	
5,709,632	A	1/1998	Socwell	
6,053,848	A	4/2000	Eschenbach	
6,146,315	A	11/2000	Schonenberger	
6,348,025	B1	2/2002	Schonenberger	
2012/0010048	A1 *	1/2012	Bayerlein et al.	482/2
2012/0010053	A1 *	1/2012	Bayerlein et al.	482/54
2012/0157267	A1 *	6/2012	Lo	482/54

OTHER PUBLICATIONS

Aurel Astilean , Speedboard, Curved treadmill with taut bottom belt portion and curved top belt portion configured with timing belt on Discovery Channel "Wreckreation" television show in Jan. 2009.
Aurel Astilean, Speedboard, Curved treadmill with taut bottom belt portion and curved top belt portion configured with timing belt at IHRSA trade show in Mar. 2009.
Aurel Astilean Speedboard Curved treadmill with taut bottom belt portion and curved top belt portion configured with timing belt at FIBO trade show in Germany Apr. 2009.

* cited by examiner

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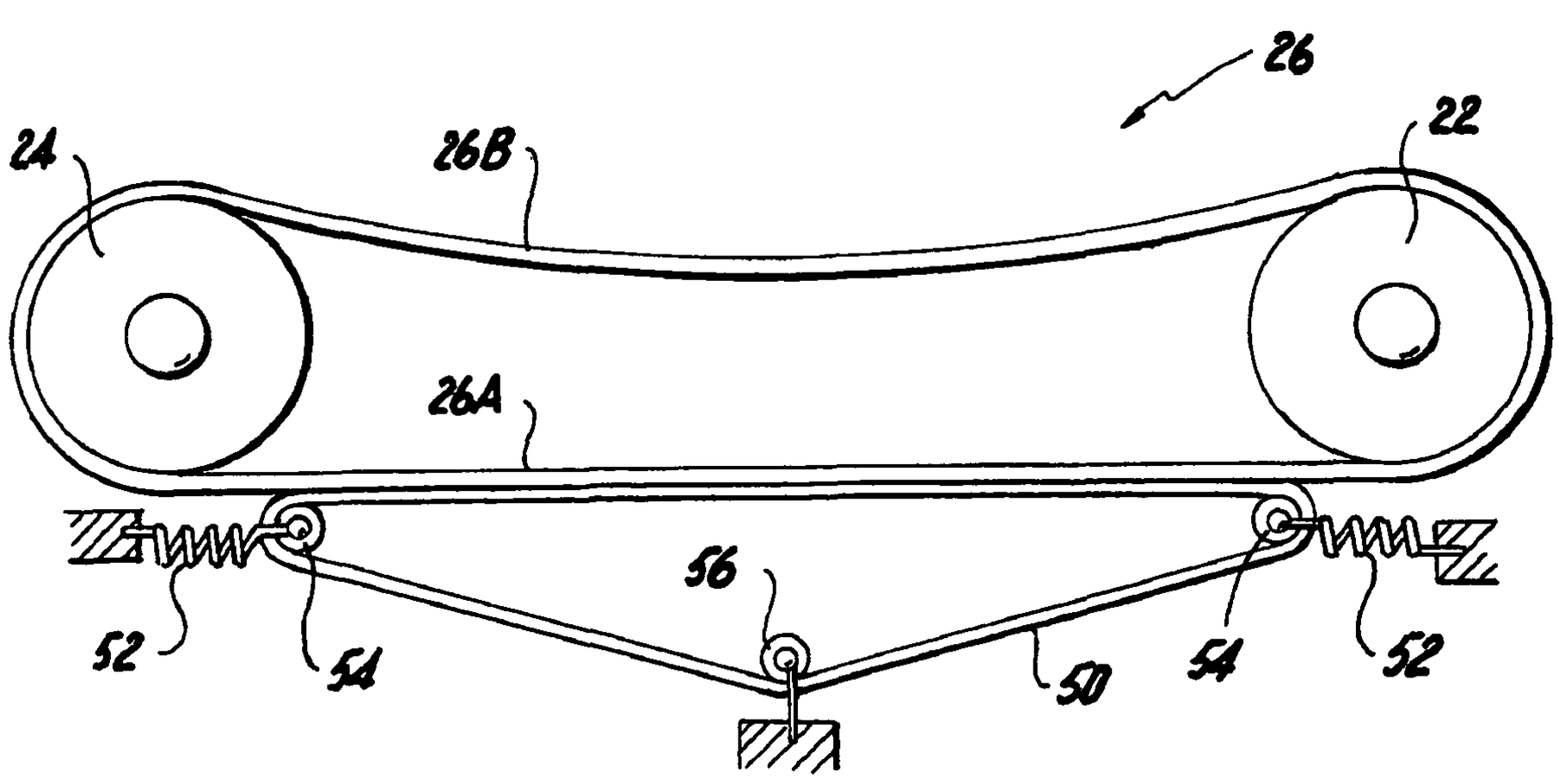
(57) **ABSTRACT**

A motor-less leg-powered curved treadmill produced that allows people to walk, jog, run, and sprint without making any adjustments to the treadmill other than shifting the user's center of gravity forward and backwards. A closed loop treadmill belt is formed with a low friction running surface of transverse wooden, plastic or rubber slats attached to each other in a resilient fashion. Since an essential feature of treadmill is the concave shape of the running surface of belt in its respective upper portion, methods are used to insure that this shape is maintained during actual use. These methods prevent the lower portion of the treadmill belt from drooping down (i.e.—it must be held taut), to prevent the top portion to be pulled taut into a flat shape between the front and rear pulley rollers.

1 Claim, 4 Drawing Sheets



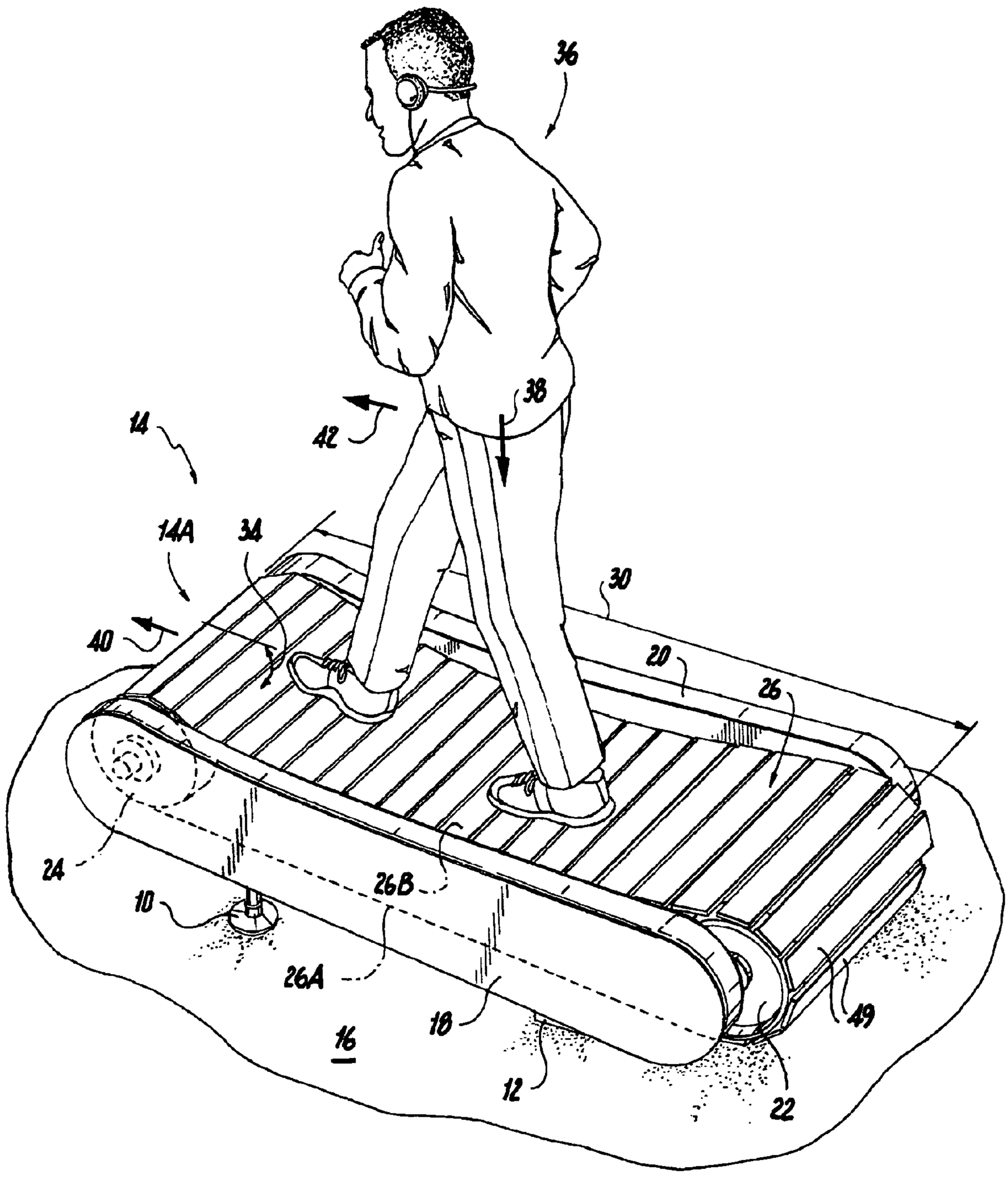


Fig. 1

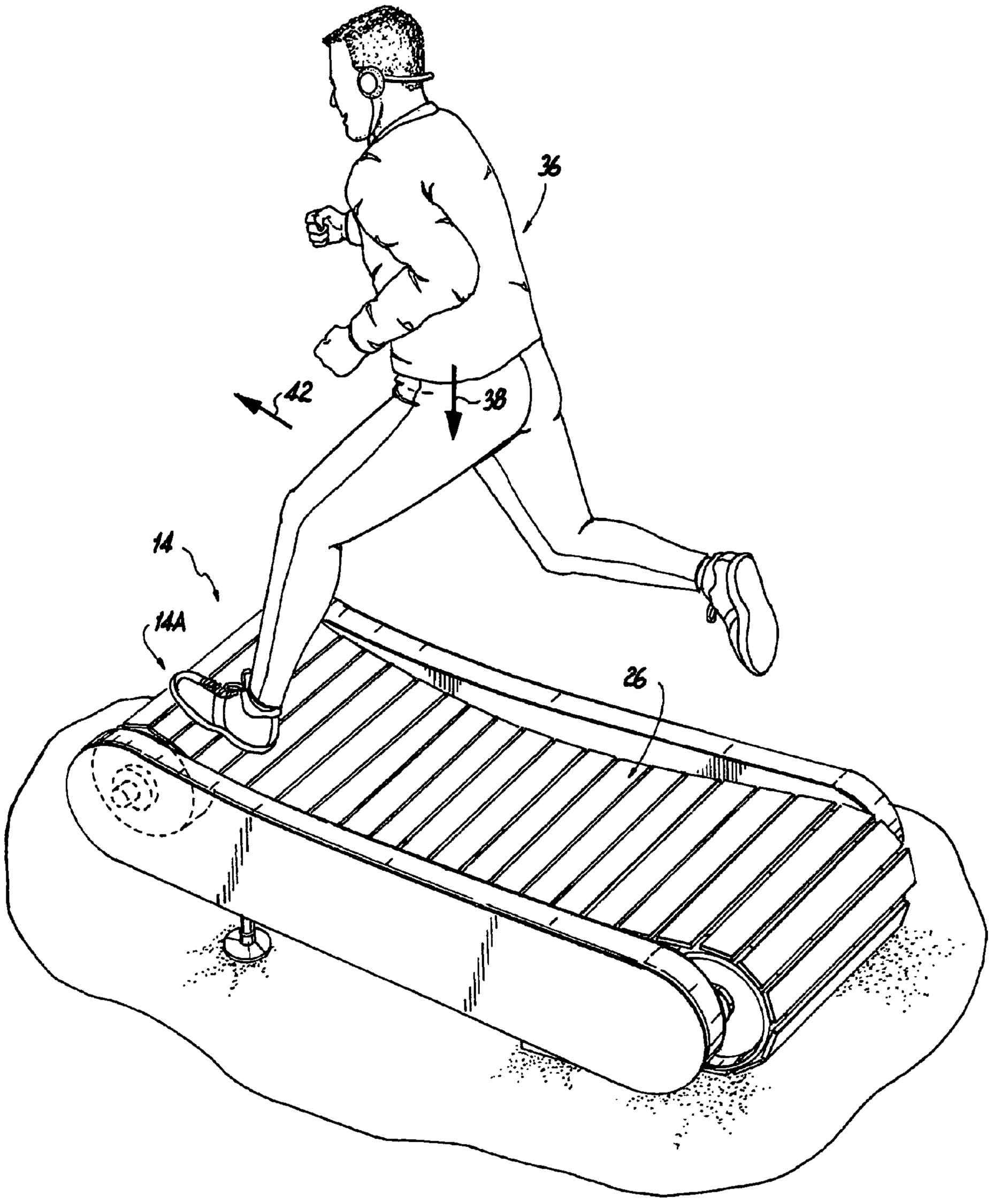


Fig. 1A

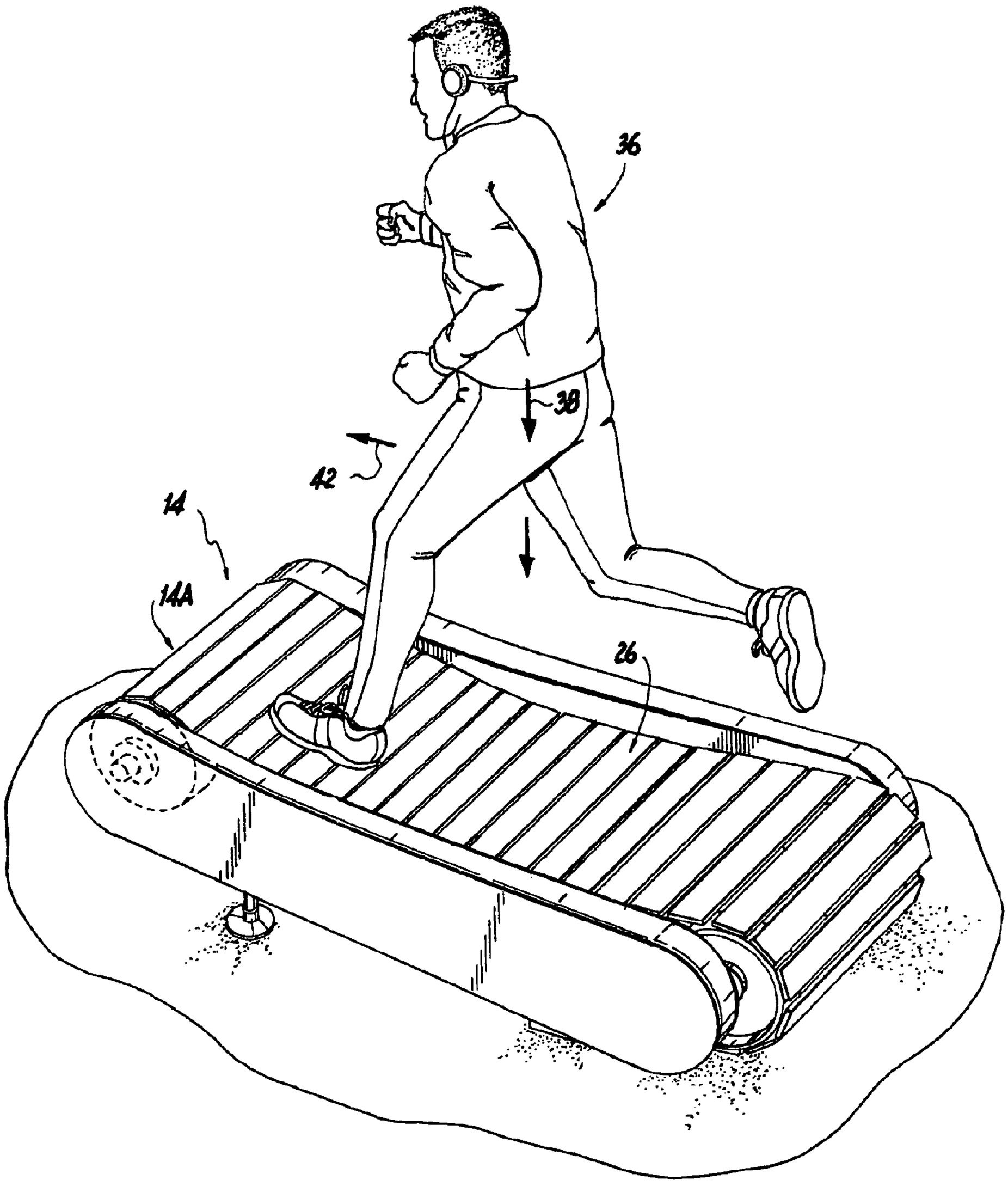


Fig. 1B

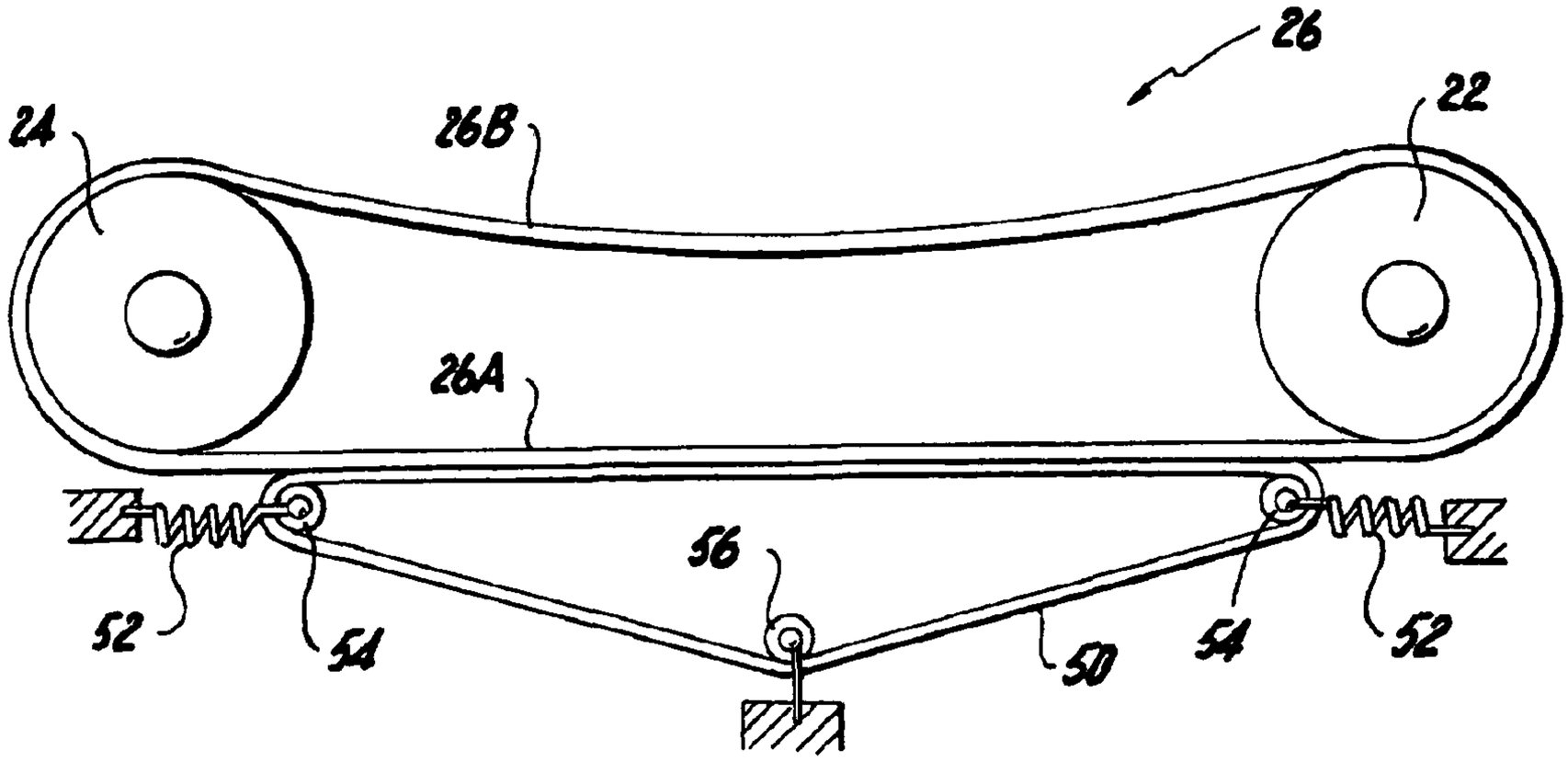


Fig. 2

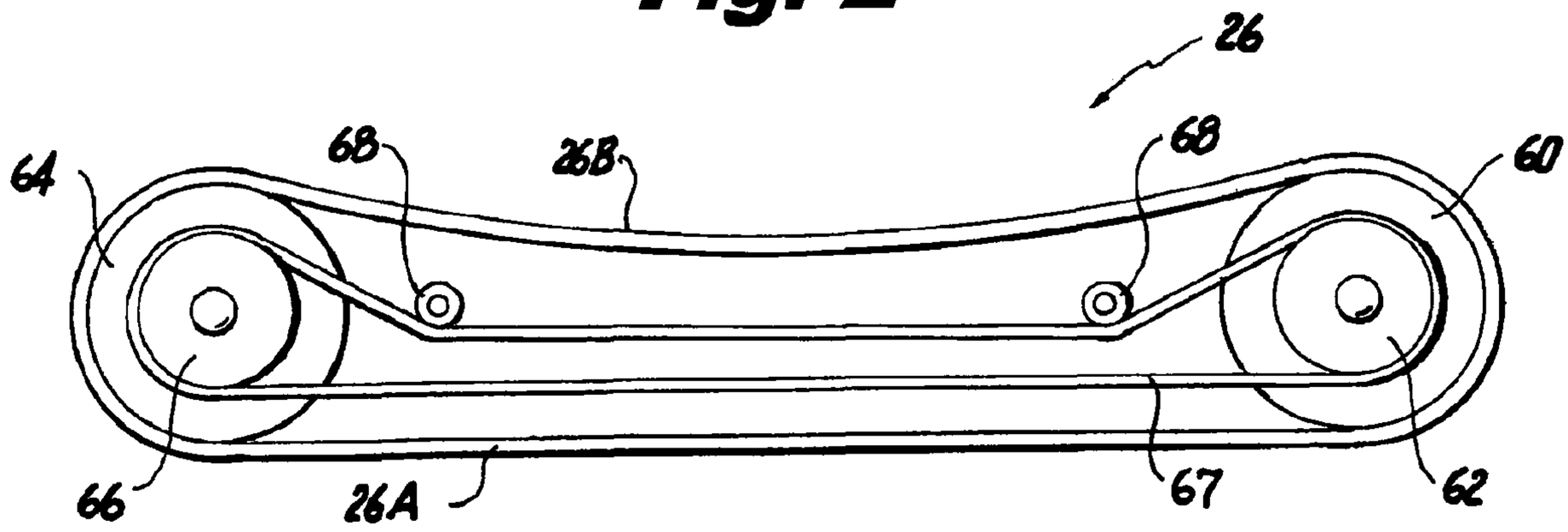


Fig. 3

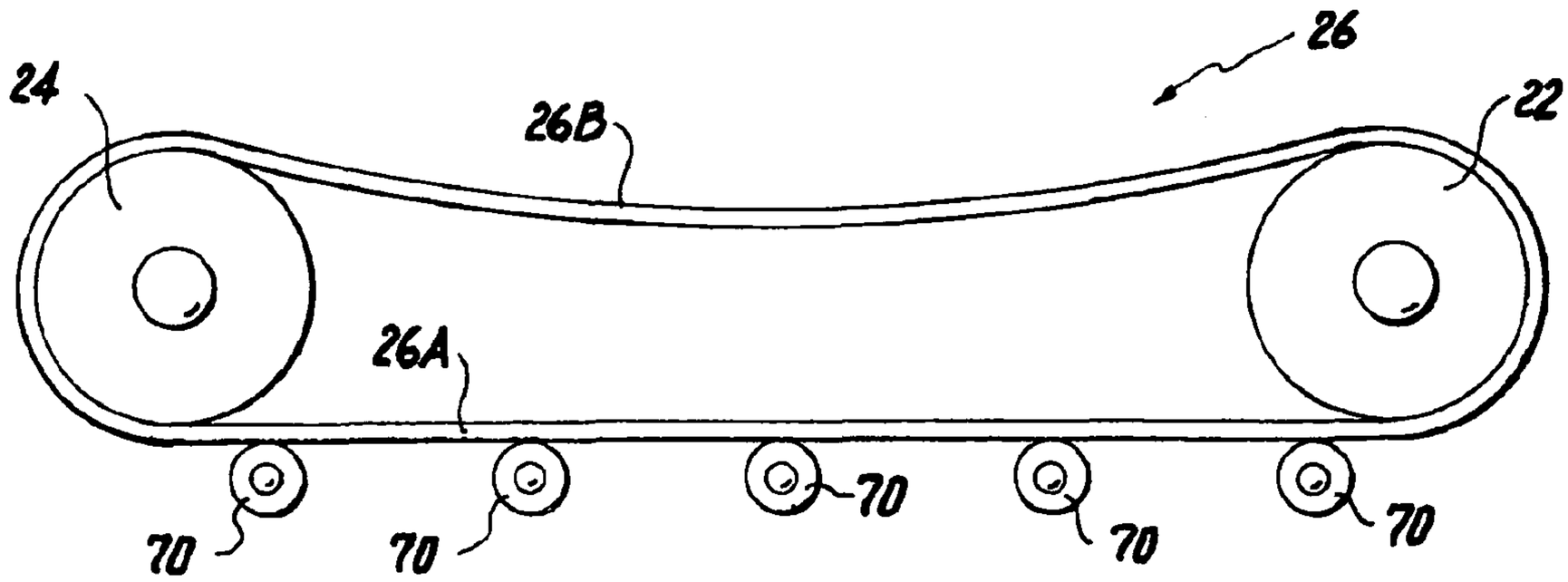


Fig. 4

LEG-POWERED TREADMILL

RELATED APPLICATIONS

This application claims benefit in part under 35 U.S.C. 119(e) from provisional Application No. 61/280,265 filed Nov. 2, 2009, the entire disclosure of which is incorporated by reference herein.

FIELD OF THE INVENTION

The present invention relates to a motor-less leg-powered treadmill produced that allows people to walk, jog, run, and sprint without making any adjustments to the treadmill other than shifting the user's center of gravity forward and backwards.

BACKGROUND OF THE INVENTION

Exercise treadmills allow people to walk, jog, run, and sprint on a stationary machine with an endless belt moving over a front and rear sets of pulleys.

OBJECTS OF THE INVENTION

It is an object of the present invention to provide a motor-less leg-powered curved treadmill produced that allows people to walk, jog, run, and sprint without making any adjustments to the treadmill other than shifting the user's center of gravity forward and backwards.

It is also an object of the present invention to provide a closed loop curved treadmill belt in a concave shape supported by end rollers in a low friction manner in a substantial stationery frame.

It is also an object of the present invention to provide a curved treadmill that assumes a concave upper contour and a taut lower portion.

Other objects which become apparent from the following description of the present invention.

SUMMARY OF THE INVENTION

The present invention is a motor-less leg-powered curved treadmill produced wherein the curved, low friction surface allows people to walk, jog, run, and sprint without making any adjustments to the treadmill other than shifting the user's center of gravity forward and backwards. This novel speed control due to the curve allows people of any weight and size to adjust their own speed in fractions of a second. The user controls the speed by positioning their body along the curved running surface. Stepping forward initiates movement, as the user propels themselves up the curve the speed increases. To slow down, the user simply drifts back towards the rear curve. For running athletes, no handrails are needed. Handrails are optional for non-athletes with balance or stability limitations. The motor-less leg-powered treadmill permits low foot impact on the running surface through it's new design, forcing the user to run correctly on the ball of the feet and therefore reducing pressure ands strain of the leg joints. This unique design of the curve in a low friction surface allows any user, regardless of weight and size, to find and maintain the speed they desire. The user steps on the concave curved treadmill belt section and begins walking, steps up further and begins running, steps up even farther and starts to sprint. When stepping backward the motor-less leg-powered treadmill will stop.

Utilizing a closed loop treadmill belt supported by end rollers in a low friction manner in a substantial stationery frame, the curved treadmill of this invention makes it possible for the user to experience a free running session, with the potential to have the real feeling of running, and the ability to stop and sprint and walk instantly, thereby simulating running outside on a running track. This novel speed control in running was not possible in the prior art because of the lack of curved low friction running surfaces.

The closed loop treadmill belt must be of such a length as compared to the distance between the end rollers to permit it to assume the required concave upper contour. To keep it in that configuration in all operational modes, a method of slackening the curved upper portion while simultaneously keeping the lower portion taut (i.e.—preventing it from drooping down) is used. This method must not add significant friction to the treadmill belt since this would detract from the running experience of the user.

Several methods of controlling the treadmill belt configuration in a low friction manner are described. One method is to use a support belt under the treadmill belt lower portion. This support belt is kept in a taut configuration with a horizontal section by using springs pulling pulleys in opposite directions.

Another method uses a timing belt linking the treadmill belt end rollers such that after the desired configuration is achieved, the treadmill belt and end rollers must move synchronously thereby denying the treadmill belt the opportunity to have its lower section droop down.

Yet another method is to support the lower section of the treadmill belt from drooping down by directly supporting this section with one or more linear arrays of low friction bearings at the peripheral edges of the belt below the lower section.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention can best be understood in connection with the accompanying drawings. It is noted that the invention is not limited to the precise embodiments shown in drawings, in which:

FIG. **1** is a perspective view of the exterior of one embodiment of the present invention; showing the runner in a slow walk in the droop of the concave upper portion of the treadmill ball.

FIG. **1**A is a perspective view of the exterior of the embodiment in FIG. **1**, showing the runner running at a fast pace uphill.

FIG. **1**B is a perspective view of the exterior of the embodiment in FIG. **1**, showing the runner running slowly in the droop of the concave portion.

FIG. **2** is a diagrammatic side view of the system components for the embodiment of FIG. **1** for implementing the present invention.

FIG. **3** is a diagrammatic side view of the system components for a second embodiment for implementing the present invention.

FIG. **4** is a diagrammatic side view of the system components for a third embodiment for implementing the present invention.

DETAILED DESCRIPTION OF THE DRAWINGS

The description of the invention which follows, together with the accompanying drawing should not be construed as limiting the invention to the example shown and described, because those skilled in the art to which this invention appertains will be able to devise other forms thereof.

FIG. **1** is a perspective view of a leg-powered treadmill **10** constructed and having an operating mode according to the present invention.

As noted in FIG. **1**, no hand rails are shown. The curved treadmill **10** can be used without hand rails. Hand rails can be optionally provided for non-athletes with balance or running stabilities limitations.

Illustrated are two leg supports **10** and **12** which lift the treadmill **14** in a clearance position above a support surface **16**, said treadmill **10** having space apart sides **18** and **20** which have journalled for rotation end rollers **22** and **24** which support a closed loop treadmill belt **26**. Low friction methods to be described are used to hold taut the length of the lower belt portion **26**A in a dimension of approximately forty-three inches denoted by dimension line **30**. The upper belt portion **26**B weighs approximately forty pounds is also denoted by the dimension line **30**.

It is to be noted that an essential feature of treadmill **10** is a concave shape subtending an acute angle **34** in the treadmill **10** front end **14**A which in practice results in the exerciser **36** running uphill and concomitantly exerting body weight **38** that contributes to driving lengthwise **40** in the direction **42** in which the exerciser runs and achieves the benefits of the exercise. As the runner **36** encounters the different positions on the treadmill belt **26** of the treadmill **14**, the angle of the surface of running changes For example, as shown in FIG. **1**, when the center of gravity of body weight, indicated by downward directional arrow **38**, below the hips of the user **36**, is in the lower dropping portion of the concave upper portion **26**B of the treadmill belt **26**, the runner **36** walks or slowly jogs in a generally horizontal orientation, as indicated by directional arrow **42** in a first slow jogging speed. But, as shown in FIG. **1**A, as the runner **36** speeds up and advances the runner's hips and center of gravity of body weight further forward up the angled slope at the front end **14**A of the treadmill belt **26**, the angle of movement **42** changes from a generally horizontal angle **42** in FIG. **1** to an acute angle **42** up off the horizontal as in FIG. **1**A, which concurrently causes the runner **36** to run vigorously faster, at the acute angle **42** up the slope of the front **14**A of the concave curve of upper belt portion **26**B of treadmill belt **26**, the runner **36** runs faster uphill. Furthermore, as shown in FIG. **1**B, it does not matter where the runner **36** puts the forward foot to change the speed. In FIG. **1**B the center of gravity in the hip region of the runner **36**'s body weight, indicated by downward directional arrow **38**, is still in the lower part of the concave droop of the upper portion **26**A of treadmill belt **26**. So even though the runner **36** in FIG. **1**B is jogging faster than walking or slowly jogging as in FIG. **1**, so long as the runner **36** has the forward foot partially up the angled slope of the forward portion **14**A of the upper belt portion **26**B, the runner will still run slower in FIG. **1**B, not because the forward foot is up the slope of upper belt portion **26**B of the treadmill belt **26**, but because the center of gravity of body weight, as indicated by downward directional arrow **38**, is still within the lower confines of the droop of the concave upper belt portion **26**B. Therefore, what changes the speed of the runner **36** and the treadmill belt **26**, is when the runner **36** moves the center of gravity of the hips of the body weight indicated by downward directional arrow **38** higher up the slope of concave upper portion **26**B of treadmill belt **26**, which causes the runner to run faster and the belt **26** to concurrently move faster around pulleys **22** and **24** with the pace of the forward advancing runner **36**.

It is known from common experience that in prior art treadmills, the upper length portion of their closed loops are flat due, it is believed, because of the inability to maintain the concave shape **34** in the length portion **26**B. This shortcoming is overcome by the weight **30** which in practice has been found to hold the concave shape **34** during the uphill running of the exerciser **36**.

A closed loop treadmill belt **26** is formed with a running surface of transverse wooden, plastic or rubber slats **49** (see FIG. **1**) attached to each other in a resilient fashion. Since an essential feature of treadmill **10** is the concave shape of the low friction running surface of belt **26** in upper portion **26**B, methods are used to insure that this shape is maintained during actual use. These methods must prevent the lower portion **26**A of treadmill belt **26** from drooping down (i.e.—must be held taut), otherwise top portion **26**B would be pulled taut into a flat shape between rollers **22** and **24**. Three methods are illustrated by the side view schematic drawings of FIGS. **2-4**.

The method of FIG. **2** shows a flat support belt loop **50** engaged with two side pulleys **54** and a third pulley **56** which is attached to treadmill **10** frame. Two springs **52** pulling in opposite directions hold belt **50** taut with a flat top configuration in contact with bottom treadmill belt portion **26**A. Since pulleys **54** and **52** are low friction, and there is no relative movement between belt **50** and belt **26**, belt **50** imposes very little drag on belt **26** while supporting lower belt portion **26**A vertically preventing it from drooping down.

The method shown in FIG. **3** shows the use of a timing belt **67** in achieving a similar result. Here end rollers **60** and **64** are attached to timing belt pulleys **62** and **66** respectively. Timing belt idlers **68** are simply used to configure timing belt geometrically to fit within the constraints of the side contours of treadmill **10**. If belt **26** is prevented from slipping relative to end rollers **60** and **64** by high friction coefficient (or by the use an integral timing belt on the inside of belt **26** and rollers with timing belt engagement grooves), once configured as shown, timing belt **67** will not permit drooping down of section **26**A since all motion is now synchronous.

In another method shown in FIG. **4**, one or more linear arrays of bearings **70** extending along opposite peripheral edges of said treadmill frame physically support lower section **26**A of treadmill belt **26** thereby preventing drooping. Bearings **70** may be ball bearings or straight ball bearing casters attached and located at respective side peripheral edges to the bottom surface of the frame of treadmill **10**.

In the foregoing description, certain terms and visual depictions are used to illustrate the preferred embodiment. However, no unnecessary limitations are to be construed by the terms used or illustrations depicted, beyond what is shown in the prior art, since the terms and illustrations are exemplary only, and are not meant to limit the scope of the present invention.

It is further known that other modifications may be made to the present invention, without departing the scope of the invention, as noted in the appended Claims.

I claim:

1. A motor-less, leg-powered treadmill comprising:

a treadmill frame;

a set of respective front and rear pulley end rollers for rotation, said front and rear pulleys supporting a closed loop treadmill belt;

said closed loop treadmill belt comprising a plurality of parallel slats oriented perpendicular to an axis of rotation of said belt, said parallel slats attached to each other in a resilient fashion;

said closed loop treadmill belt being of such a length as compared to the distance between the end rollers to permit it to assume a required concave upper contour;

a means for slackening an upper concave portion of said closed loop treadmill belt while simultaneously keeping

a lower portion of said closed loop treadmill belt taut, preventing said lower portion from drooping down during rotation and exertion of walking or miming force upon said upper concave portion of said closed loop treadmill belt, said means for slackening the upper portion while simultaneously keeping the lower portion taut, preventing said lower portion from drooping down during rotation and exertion of walking or running force upon said upper concave portion of said closed loop treadmill belt comprises a timing belt having respective timing belt pulleys attached to said front and rear pulley rollers for said closed loop treadmill belt, wherein timing belt idlers are used to configure said timing belt geometrically to fit within constraints of side contours of said treadmill, wherein if said closed loop treadmill belt is prevented from slipping relative to said end rollers by a high friction coefficient, once configured, said timing belt will not permit drooping down of said lower taut portion of said closed loop treadmill belt because all respective motion is synchronous.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 8,308,619 B1
APPLICATION NO. : 12/925770
DATED : November 13, 2012
INVENTOR(S) : Aurel A. Astilean and Dan Bostan

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

ON THE TITLE PAGE

ITEM 12 SHOULD READ
ASTILEAN ET AL.

ITEM 76 SHOULD READ
Inventor(s): Aurel A. Astilean, East Hampton, NY (US); and
Dan Bostan, Beaconsfield, QC H9w (CANADA)

Signed and Sealed this
Twenty-sixth Day of January, 2016

Michelle K. Lee

Michelle K. Lee
Director of the United States Patent and Trademark Office